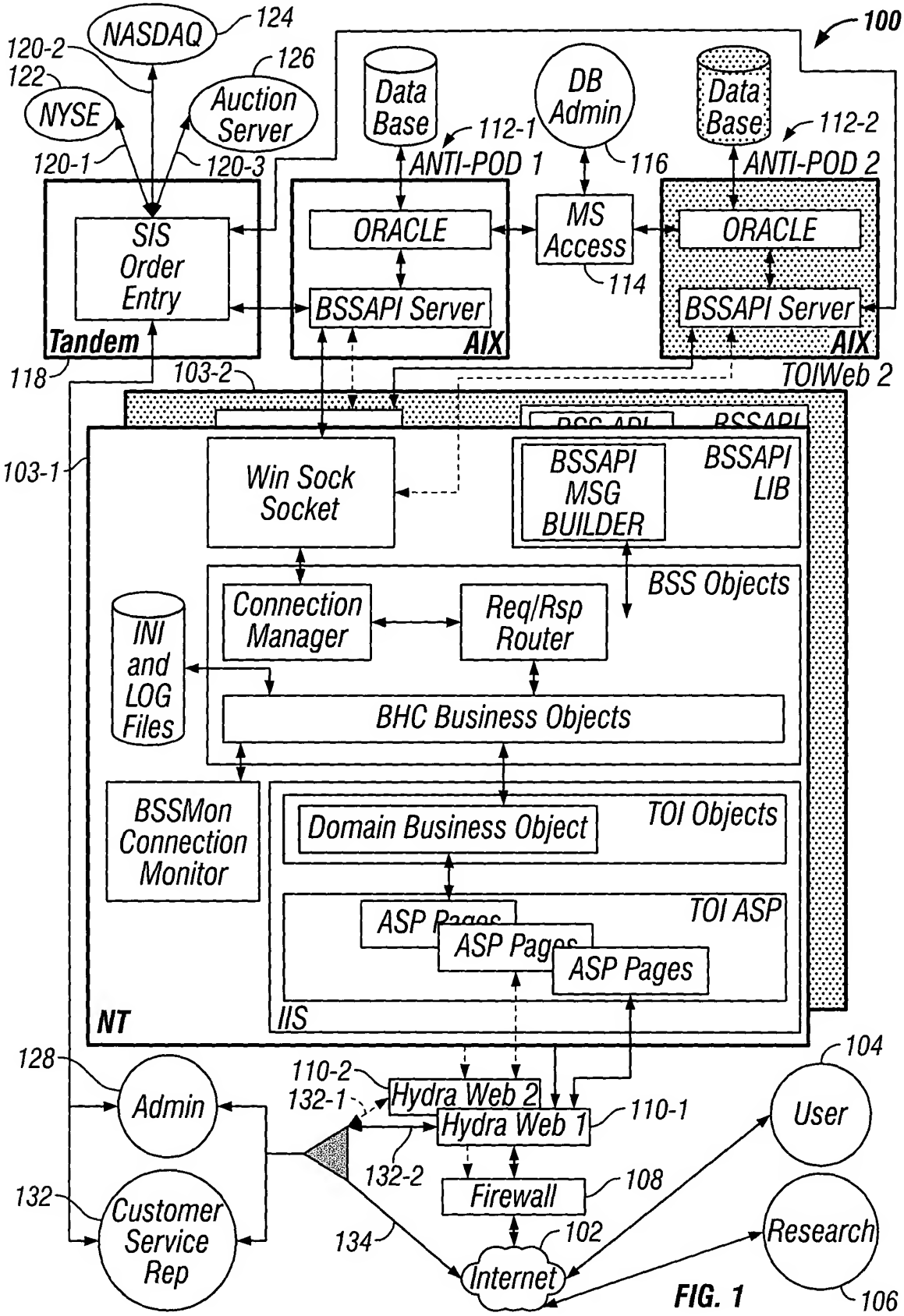
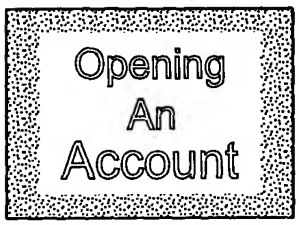

100
NASDAQ
124
120-2
122
NYSE
126
Auction Server
120-1
120-3
Data Base
112-1
ANTI-POD 1
DB Admin
116
Data Base
112-2
ANTI-POD 2
SIS Order Entry
Tandem
ORACLE
BSSAPI Server
AIX
MS Access
114
ORACLE
BSSAPI Server
AIX
118
103-2
TOIWeb 2
103-1
Win Sock Socket
BSSAPI MSG BUILDER
BSSAPI LIB
BSS Objects
Connection Manager
Req/Rsp Router
INI and LOG Files
BHC Business Objects
BSSMon Connection Monitor
Domain Business Object
TOI Objects
ASP Pages
TOI ASP
ASP Pages
ASP Pages
NT
IIS
128
Admin
110-2
132-1
Hydra Web 2
Hydra Web 1
110-1
104
User
132-2
Firewall
108
132
Customer Service Rep
134
102
Internet
Research
106

FIG. 1



Underwriter Customer Service Activities:

- *Receive Account Opening Requests*
- *Assign Account Numbers to Approved Customers*
- *Notify OpenIPO Admin., of Account Number, UserID, and PIN*
- *Receive Confirmation of UserID and PIN*
- *Contact Institution with UserID and Temp PIN*

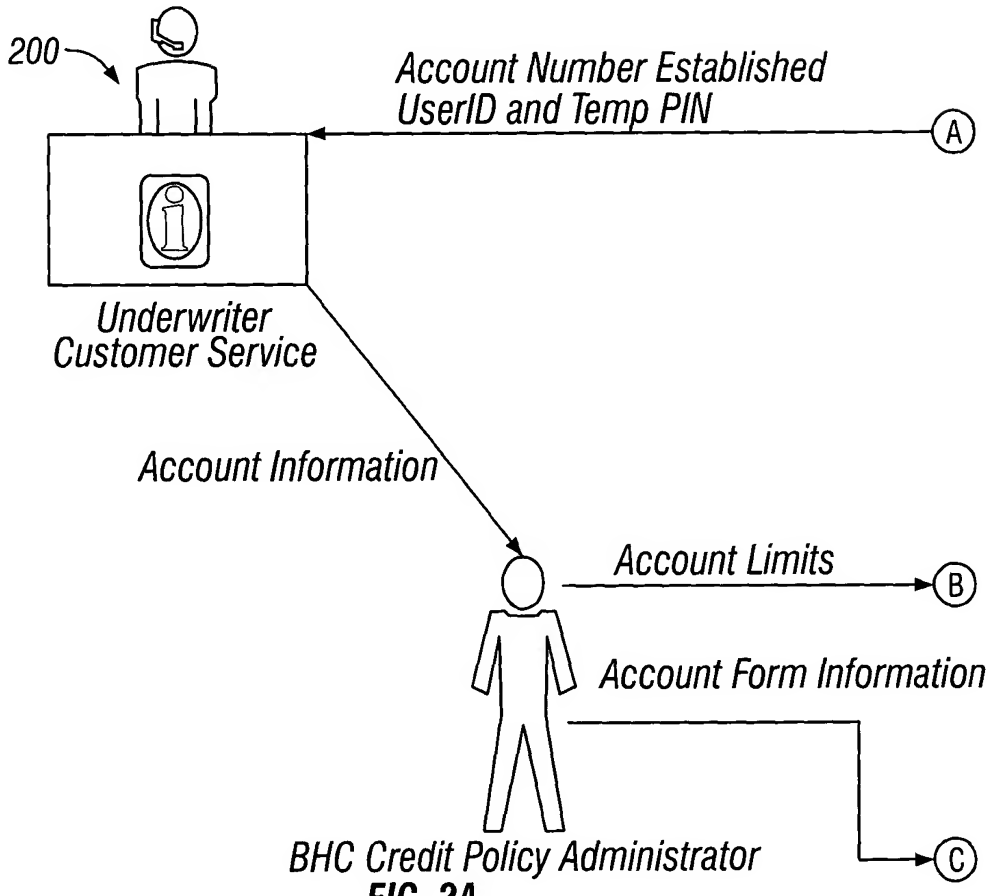


FIG. 2A

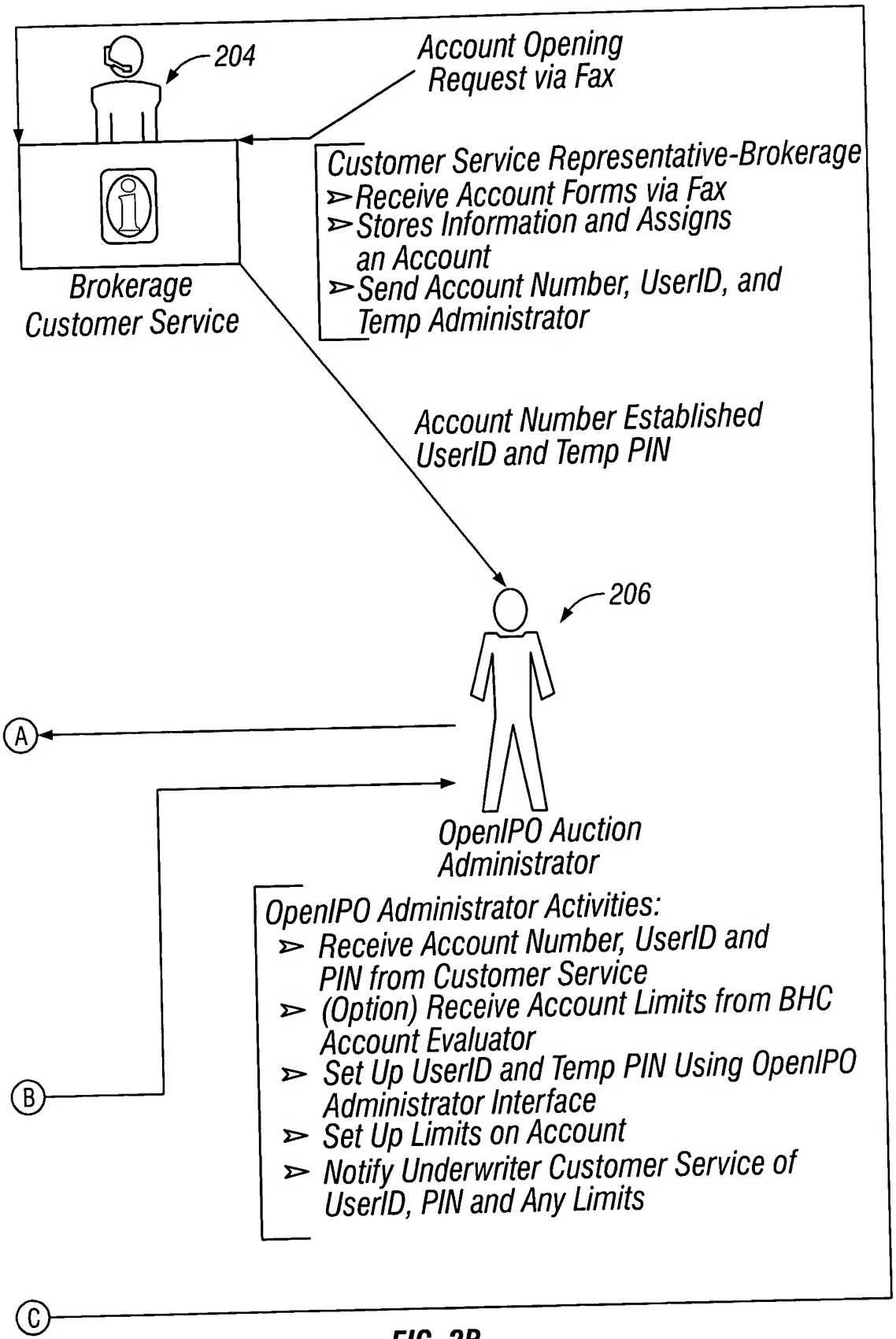

204
Account Opening Request via Fax
Customer Service Representative-Brokerage
➢ Receive Account Forms via Fax
➢ Stores Information and Assigns an Account
➢ Send Account Number, UserID, and Temp Administrator
Brokerage Customer Service
Account Number Established UserID and Temp PIN
206
A
OpenIPO Auction Administrator
OpenIPO Administrator Activities:
➢ Receive Account Number, UserID and PIN from Customer Service
➢ (Option) Receive Account Limits from BHC Account Evaluator
➢ Set Up UserID and Temp PIN Using OpenIPO Administrator Interface
➢ Set Up Limits on Account
➢ Notify Underwriter Customer Service of UserID, PIN and Any Limits
B
C

FIG. 2B

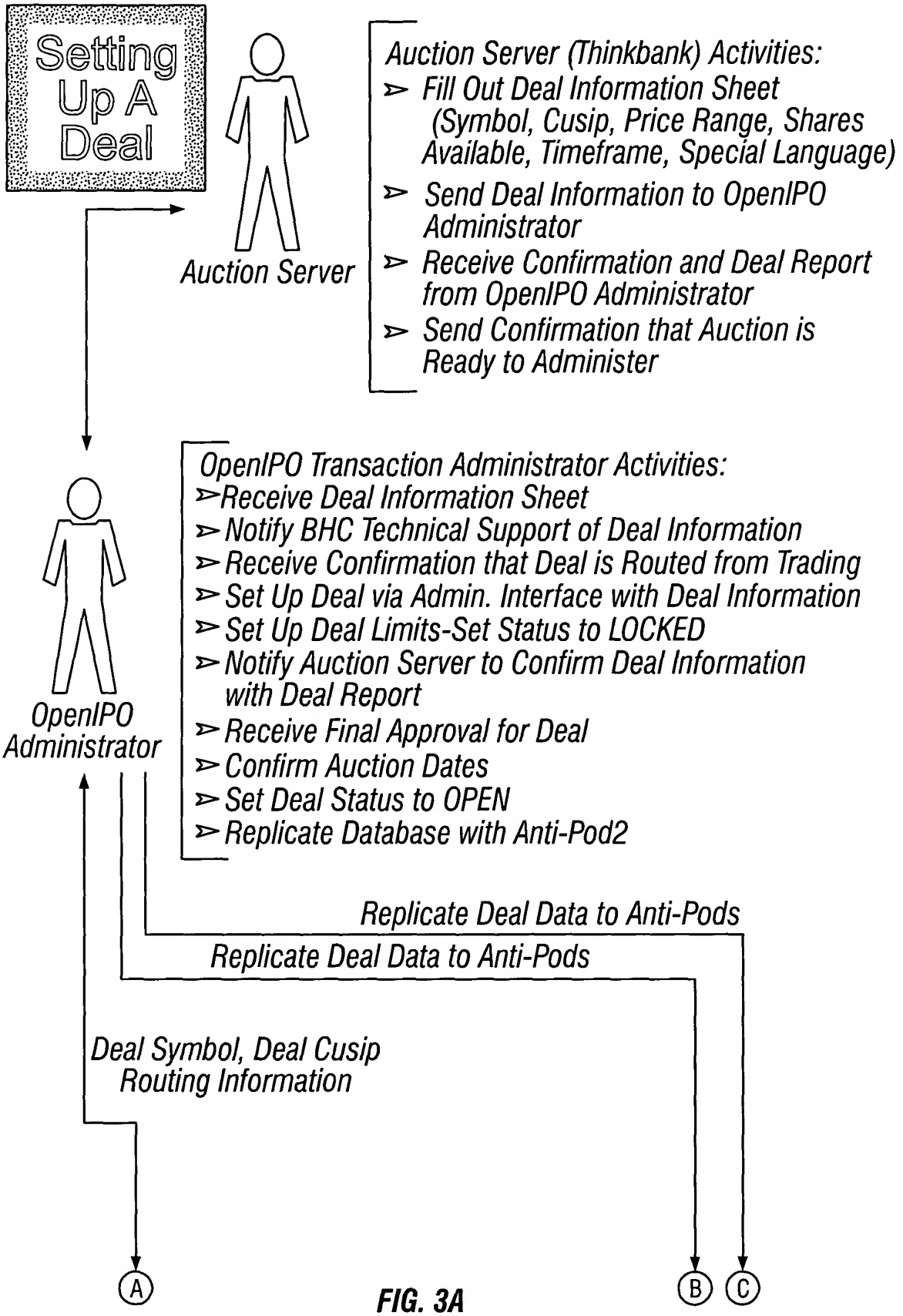
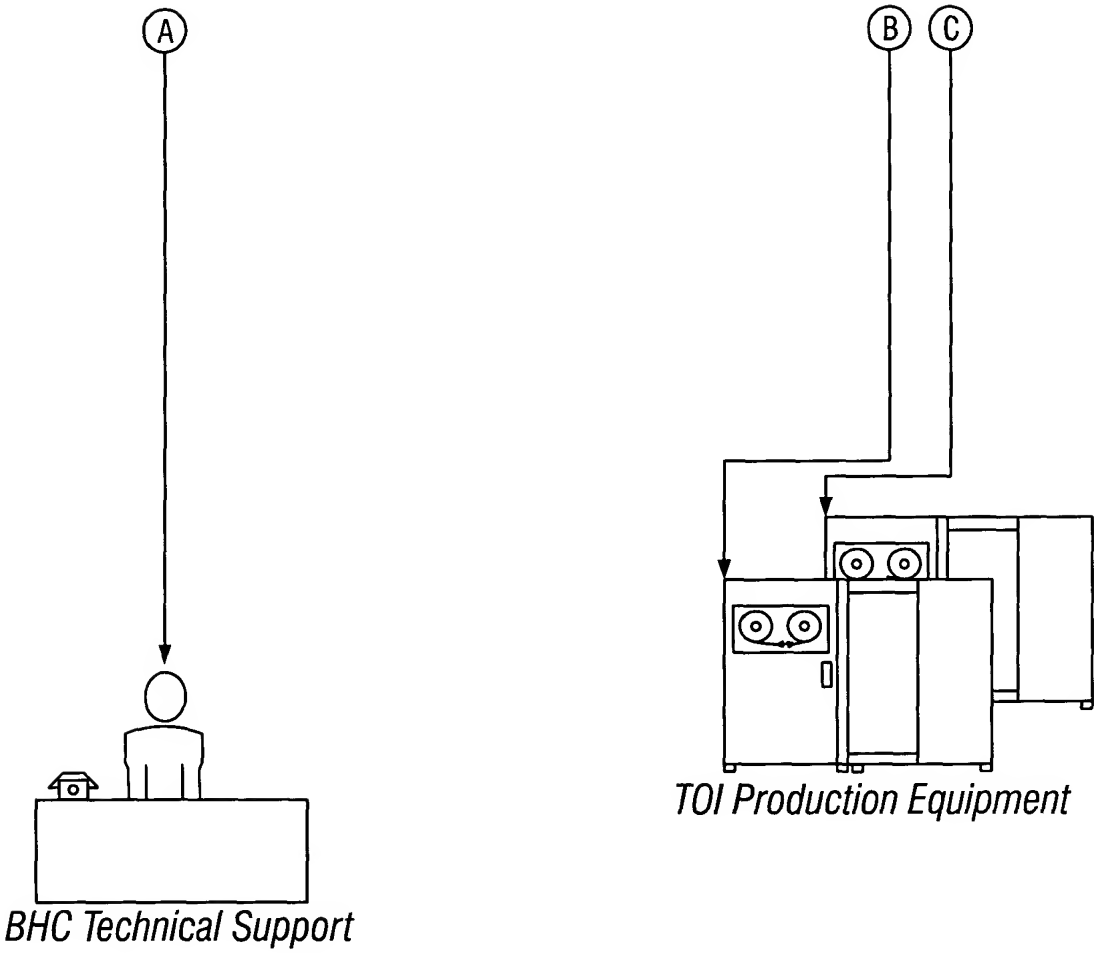

Setting Up A Deal
Auction Server
Auction Server (Thinkbank) Activities:
➢ Fill Out Deal Information Sheet (Symbol, Cusip, Price Range, Shares Available, Timeframe, Special Language)
➢ Send Deal Information to OpenIPO Administrator
➢ Receive Confirmation and Deal Report from OpenIPO Administrator
➢ Send Confirmation that Auction is Ready to Administer
OpenIPO Administrator
OpenIPO Transaction Administrator Activities:
➢ Receive Deal Information Sheet
➢ Notify BHC Technical Support of Deal Information
➢ Receive Confirmation that Deal is Routed from Trading
➢ Set Up Deal via Admin. Interface with Deal Information
➢ Set Up Deal Limits-Set Status to LOCKED
➢ Notify Auction Server to Confirm Deal Information with Deal Report
➢ Receive Final Approval for Deal
➢ Confirm Auction Dates
➢ Set Deal Status to OPEN
➢ Replicate Database with Anti-Pod2
Replicate Deal Data to Anti-Pods
Replicate Deal Data to Anti-Pods
Deal Symbol, Deal Cusip Routing Information
A
B
C

FIG. 3A



BHC Technical Support Activities:
- *Receive Deal Information from OpenIPO Administrator*
- *Set Up Routing for Auction Symbol*
- *Send Confirmation to OpenIPO Administrator*

FIG. 3B

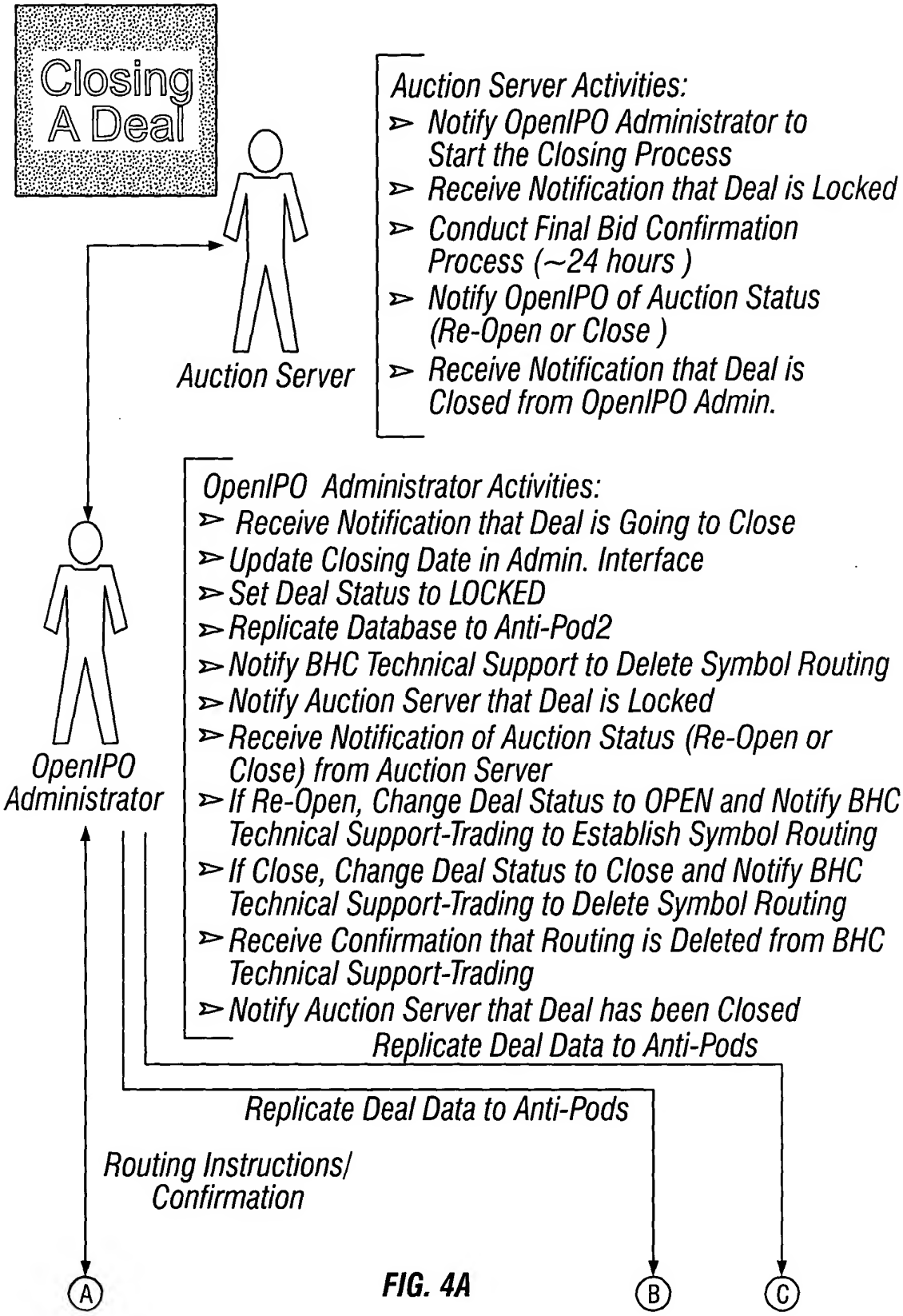
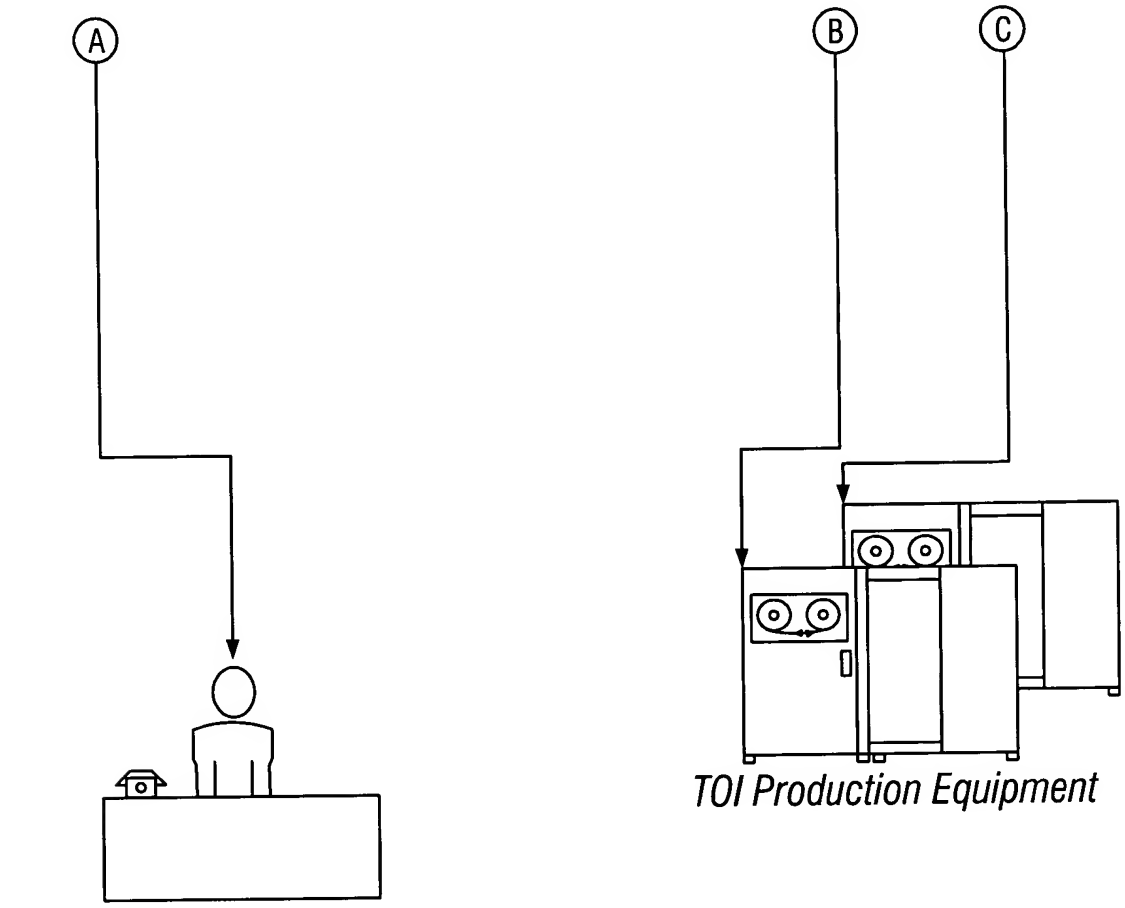

Closing A Deal
Auction Server
Auction Server Activities:
Notify OpenIPO Administrator to Start the Closing Process
Receive Notification that Deal is Locked
Conduct Final Bid Confirmation Process (~24 hours)
Notify OpenIPO of Auction Status (Re-Open or Close)
Receive Notification that Deal is Closed from OpenIPO Admin.
OpenIPO Administrator
OpenIPO Administrator Activities:
Receive Notification that Deal is Going to Close
Update Closing Date in Admin. Interface
Set Deal Status to LOCKED
Replicate Database to Anti-Pod2
Notify BHC Technical Support to Delete Symbol Routing
Notify Auction Server that Deal is Locked
Receive Notification of Auction Status (Re-Open or Close) from Auction Server
If Re-Open, Change Deal Status to OPEN and Notify BHC Technical Support-Trading to Establish Symbol Routing
If Close, Change Deal Status to Close and Notify BHC Technical Support-Trading to Delete Symbol Routing
Receive Confirmation that Routing is Deleted from BHC Technical Support-Trading
Notify Auction Server that Deal has been Closed
Replicate Deal Data to Anti-Pods
Replicate Deal Data to Anti-Pods
Routing Instructions/ Confirmation
A
B
C

FIG. 4A



SIS/Trading Support Activities:
- Receive Routing Instructions from OpenIPO Administrator
- Delete Routing for Deal Symbol
- Send Confirmation that Routing is Terminated

FIG. 4B

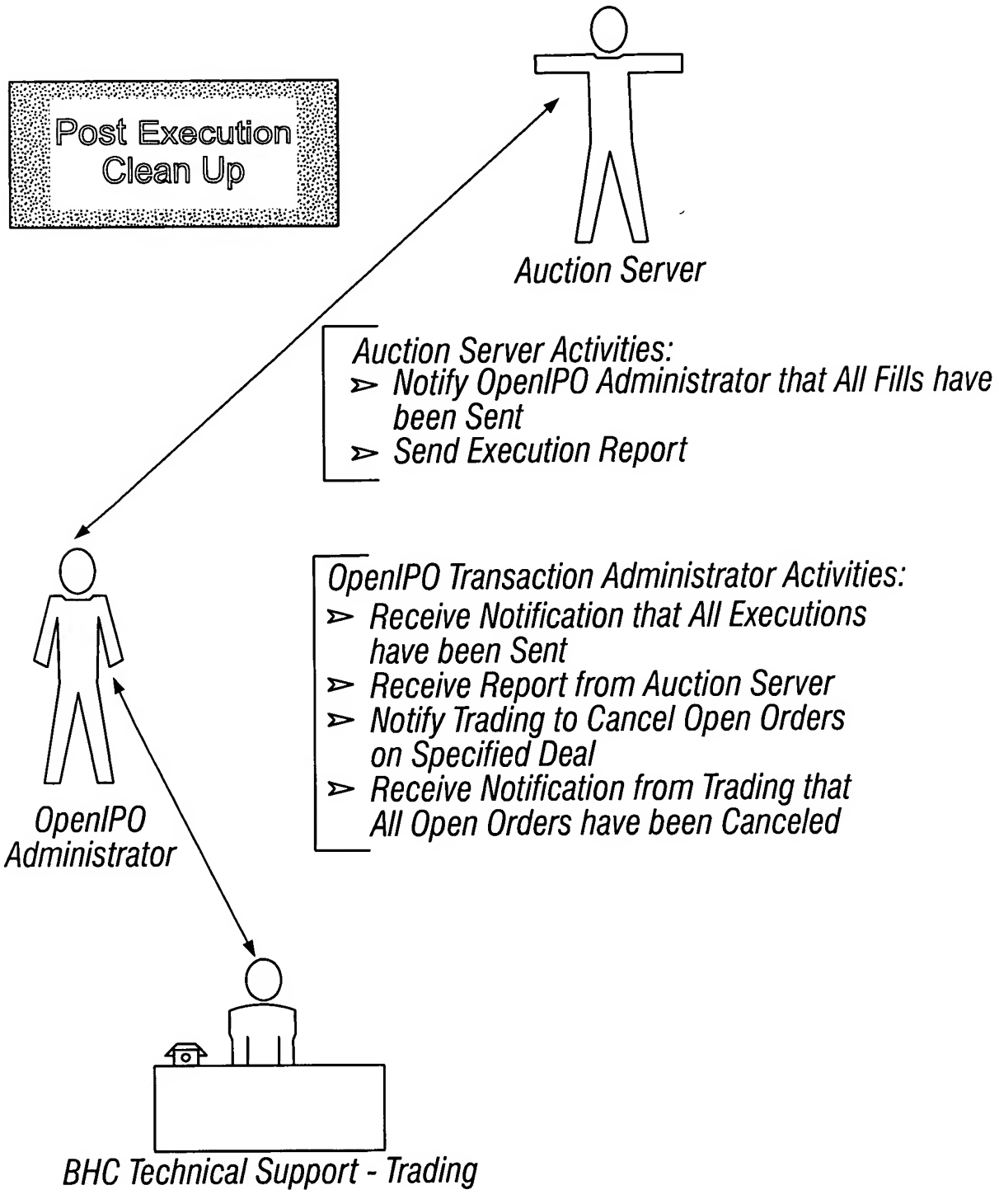

Post Execution Clean Up
Auction Server
Auction Server Activities:
Notify OpenIPO Administrator that All Fills have been Sent
Send Execution Report
OpenIPO Transaction Administrator Activities:
Receive Notification that All Executions have been Sent
Receive Report from Auction Server
Notify Trading to Cancel Open Orders on Specified Deal
Receive Notification from Trading that All Open Orders have been Canceled
OpenIPO Administrator
BHC Technical Support - Trading
BHC Technical Support - Trading:
Receive Notification to Cancel Open Orders for Specific Deal
Manually Cancel Open Orders
Send Confirmation that All Open Orders have been Canceled

FIG. 5

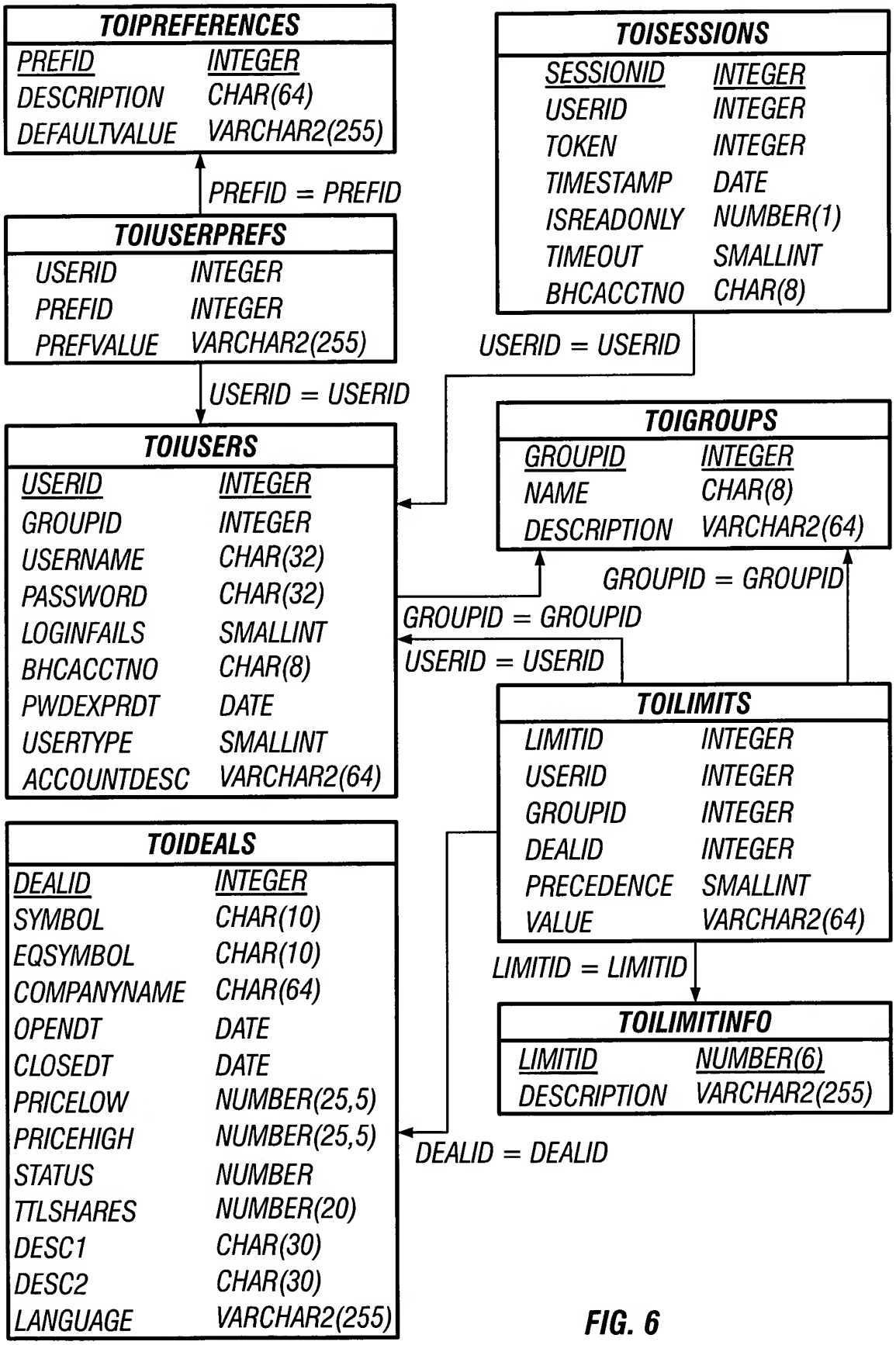

TOIPREFERENCES
PREFID INTEGER
DESCRIPTION CHAR(64)
DEFAULTVALUE VARCHAR2(255)
PREFID = PREFID
TOIUSERPREFS
USERID INTEGER
PREFID INTEGER
PREFVALUE VARCHAR2(255)
USERID = USERID
TOISESSIONS
SESSIONID INTEGER
USERID INTEGER
TOKEN INTEGER
TIMESTAMP DATE
ISREADONLY NUMBER(1)
TIMEOUT SMALLINT
BHCACCTNO CHAR(8)
USERID = USERID
TOIGROUPS
GROUPID INTEGER
NAME CHAR(8)
DESCRIPTION VARCHAR2(64)
GROUPID = GROUPID
TOIUSERS
USERID INTEGER
GROUPID INTEGER
USERNAME CHAR(32)
PASSWORD CHAR(32)
LOGINFAILS SMALLINT
BHCACCTNO CHAR(8)
PWDEXPRDT DATE
USERTYPE SMALLINT
ACCOUNTDESC VARCHAR2(64)
GROUPID = GROUPID
USERID = USERID
TOILIMITS
LIMITID INTEGER
USERID INTEGER
GROUPID INTEGER
DEALID INTEGER
PRECEDENCE SMALLINT
VALUE VARCHAR2(64)
LIMITID = LIMITID
TOILIMITINFO
LIMITID NUMBER(6)
DESCRIPTION VARCHAR2(255)
TOIDEALS
DEALID INTEGER
SYMBOL CHAR(10)
EQSYMBOL CHAR(10)
COMPANYNAME CHAR(64)
OPENDT DATE
CLOSEDT DATE
PRICELOW NUMBER(25,5)
PRICEHIGH NUMBER(25,5)
STATUS NUMBER
TTLSHARES NUMBER(20)
DESC1 CHAR(30)
DESC2 CHAR(30)
LANGUAGE VARCHAR2(255)
DEALID = DEALID

FIG. 6

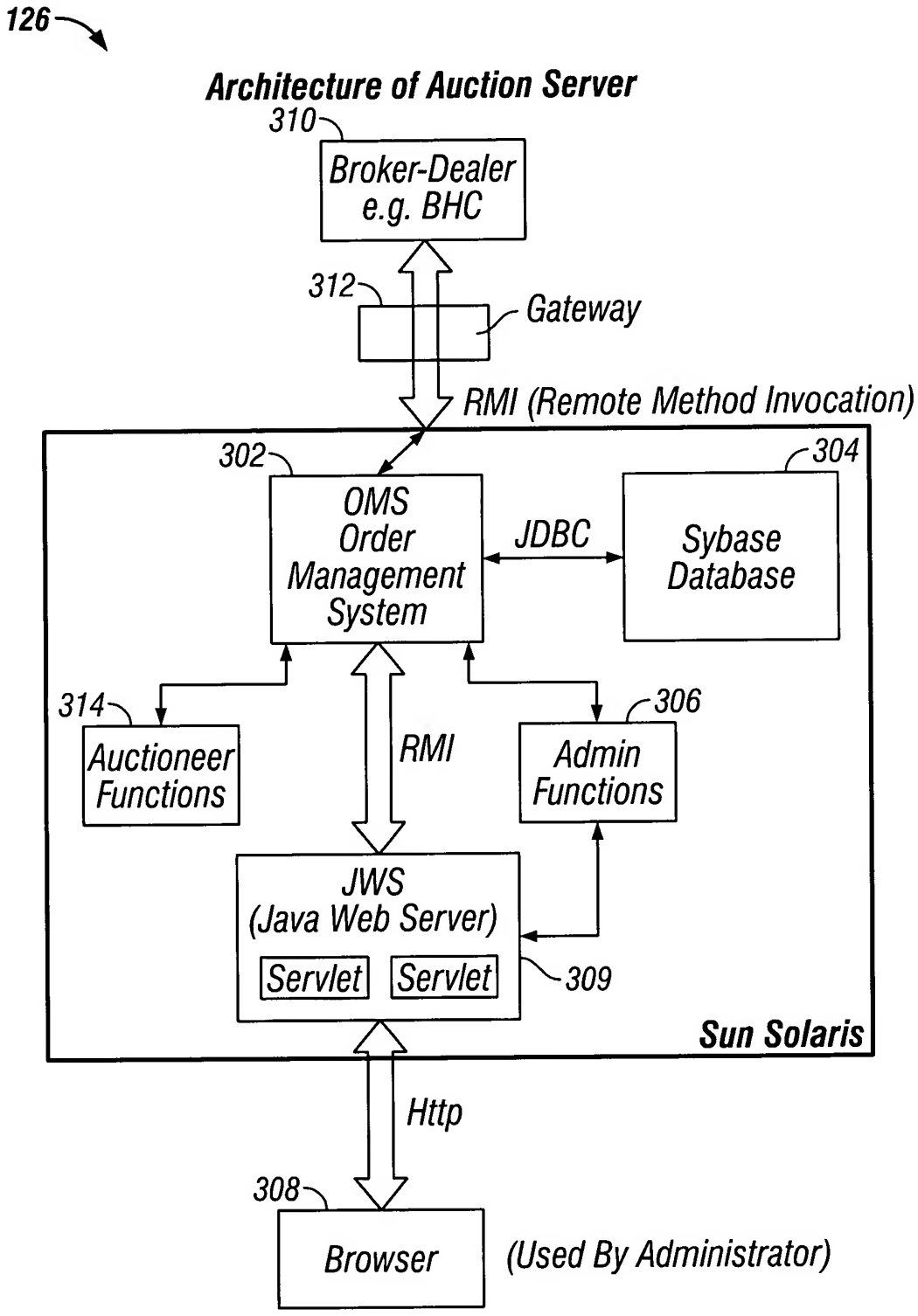

126
Architecture of Auction Server
310
Broker-Dealer
e.g. BHC
312
Gateway
RMI (Remote Method Invocation)
302
OMS
Order
Management
System
JDBC
304
Sybase
Database
314
Auctioneer
Functions
RMI
306
Admin
Functions
JWS
(Java Web Server)
Servlet
Servlet
309
Sun Solaris
Http
308
Browser
(Used By Administrator)

FIG. 7

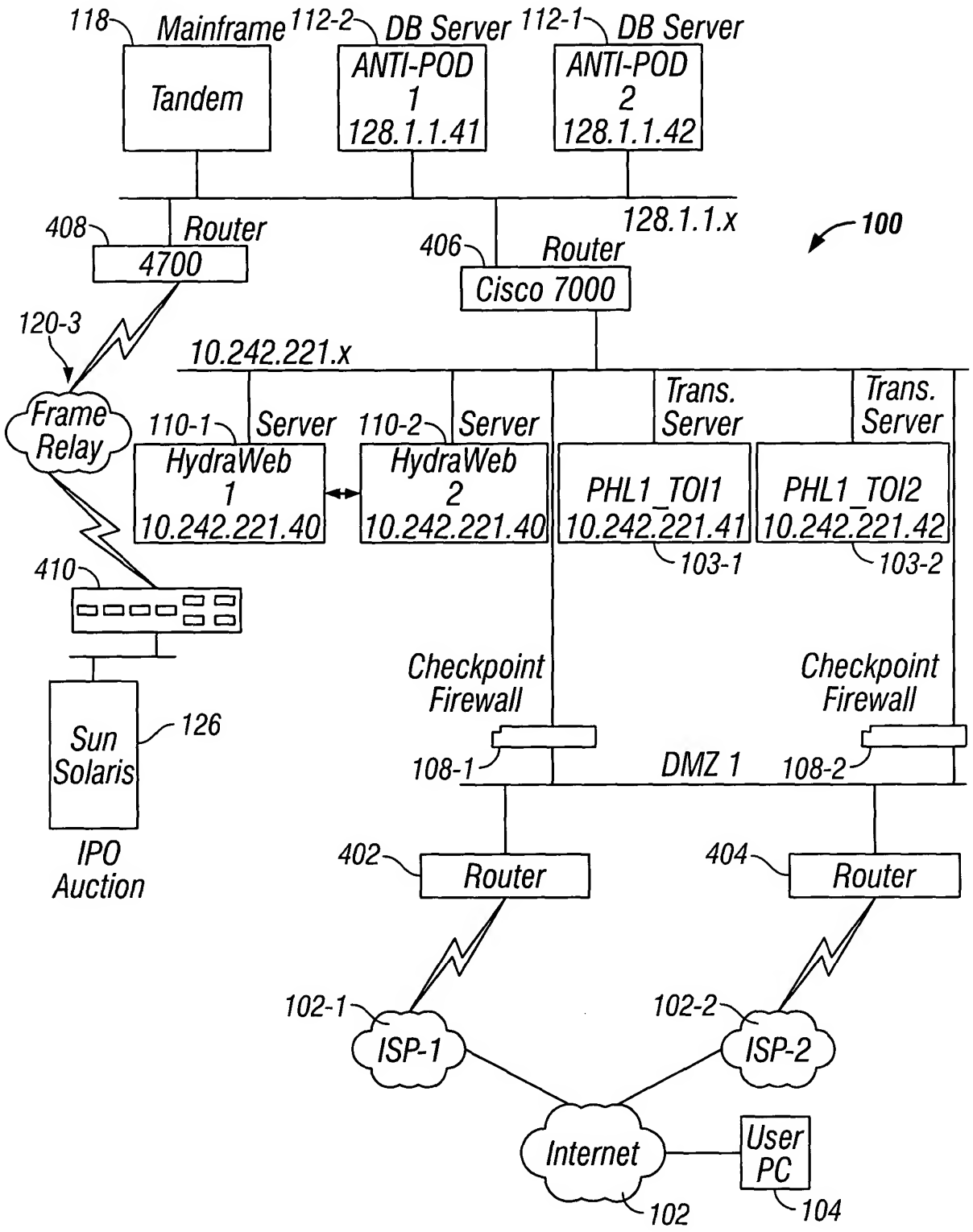

118
Mainframe
Tandem
112-2
DB Server
ANTI-POD 1
128.1.1.41
112-1
DB Server
ANTI-POD 2
128.1.1.42
128.1.1.x
100
408
Router
4700
406
Router
Cisco 7000
120-3
10.242.221.x
Frame Relay
110-1
Server
HydraWeb 1
10.242.221.40
110-2
Server
HydraWeb 2
10.242.221.40
Trans. Server
PHL1_TOI1
10.242.221.41
103-1
Trans. Server
PHL1_TOI2
10.242.221.42
103-2
410
Checkpoint Firewall
108-1
DMZ 1
Checkpoint Firewall
108-2
Sun Solaris
126
IPO Auction
402
Router
404
Router
102-1
ISP-1
102-2
ISP-2
Internet
102
User PC
104

FIG. 8

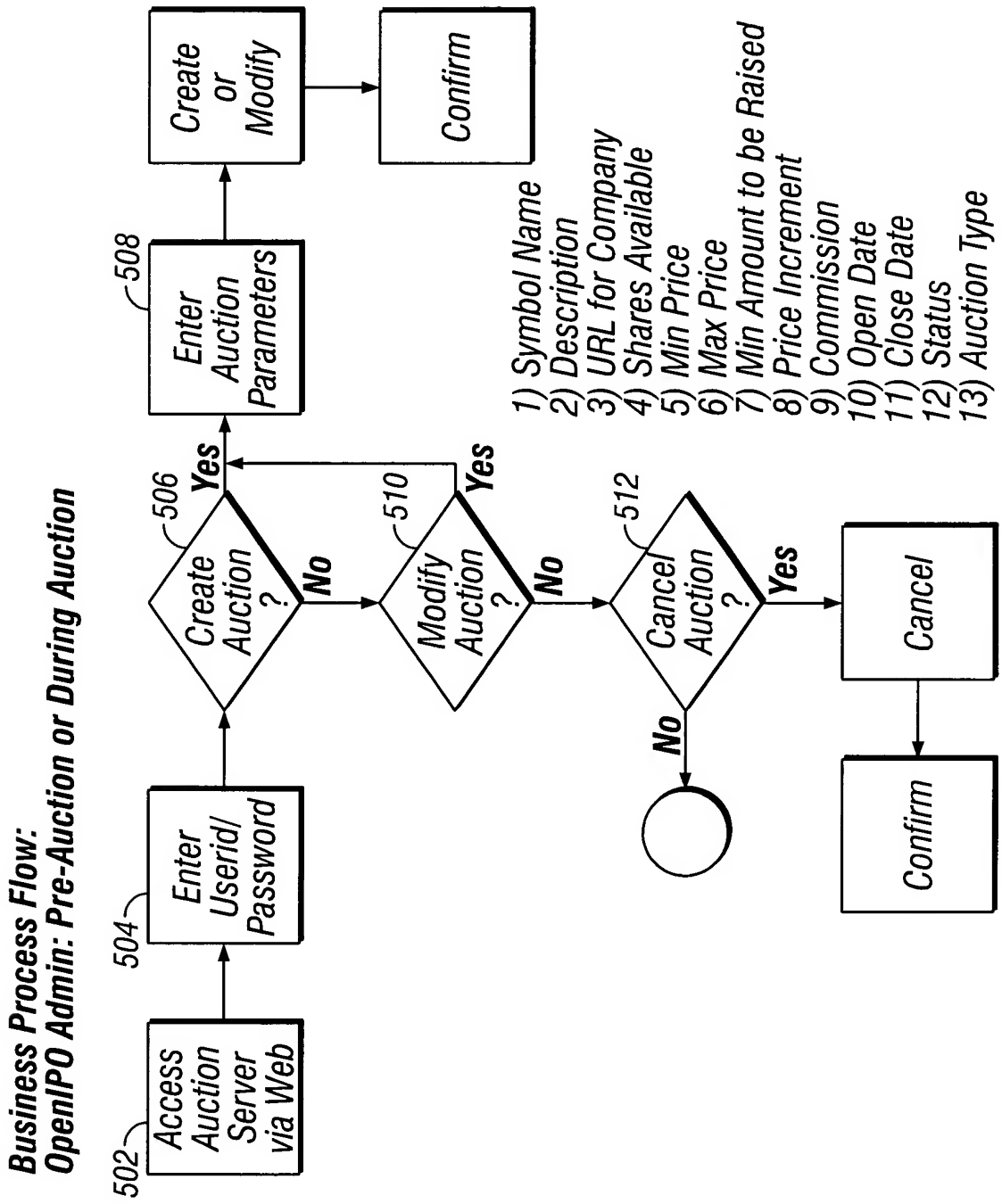

Business Process Flow:
OpenIPO Admin: Pre-Auction or During Auction
502
Access Auction Server via Web
504
Enter Userid/ Password
506
Create Auction ?
Yes
No
508
Enter Auction Parameters
Create or Modify
Confirm
510
Modify Auction ?
Yes
No
512
Cancel Auction ?
Yes
No
Cancel
Confirm
1) Symbol Name
2) Description
3) URL for Company
4) Shares Available
5) Min Price
6) Max Price
7) Min Amount to be Raised
8) Price Increment
9) Commission
10) Open Date
11) Close Date
12) Status
13) Auction Type

FIG. 9

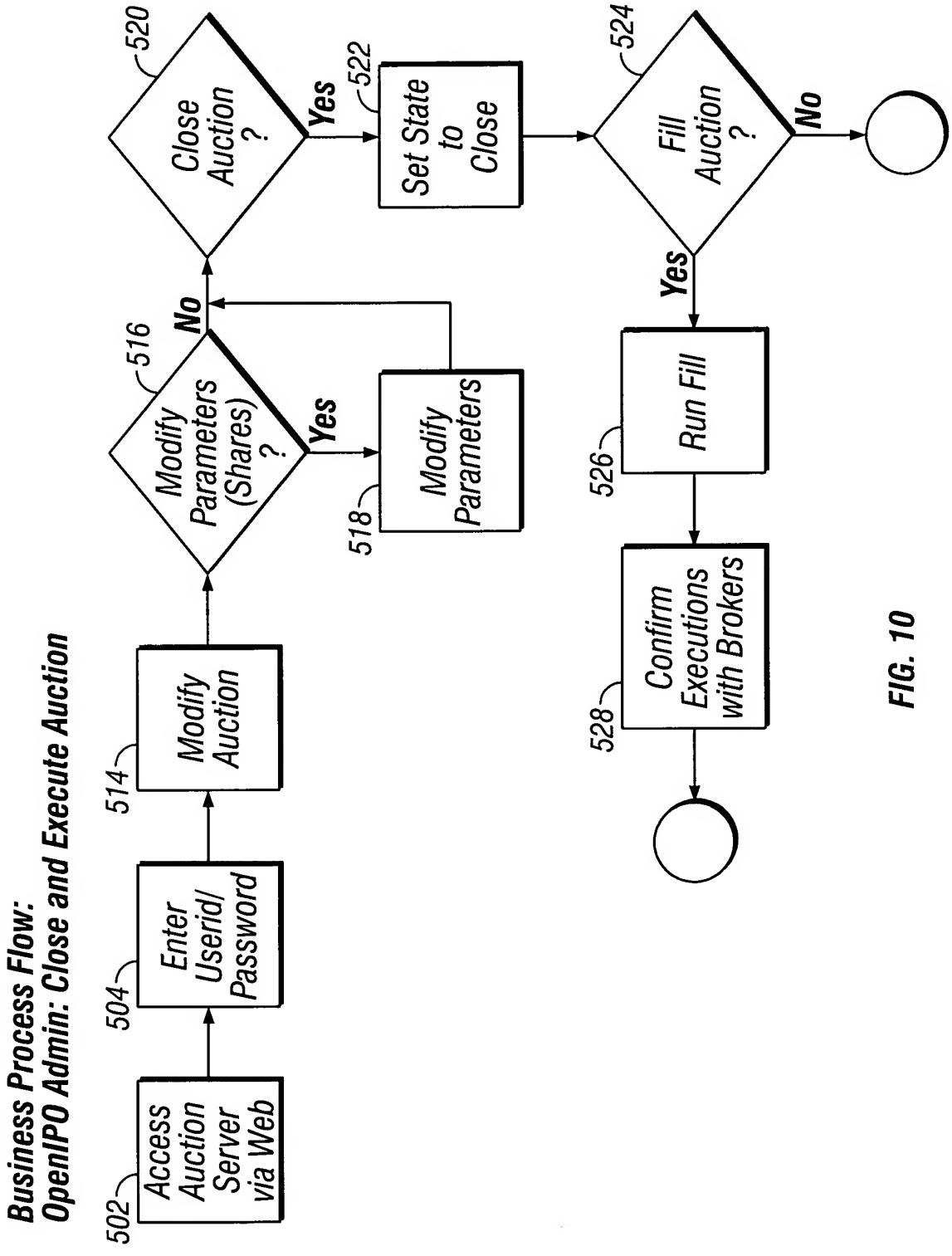

Business Process Flow:
OpenIPO Admin: Close and Execute Auction
502
Access Auction Server via Web
504
Enter Userid/ Password
514
Modify Auction
516
Modify Parameters (Shares) ?
Yes
518
Modify Parameters
No
520
Close Auction ?
Yes
522
Set State to Close
524
Fill Auction ?
No
Yes
526
Run Fill
528
Confirm Executions with Brokers

FIG. 10

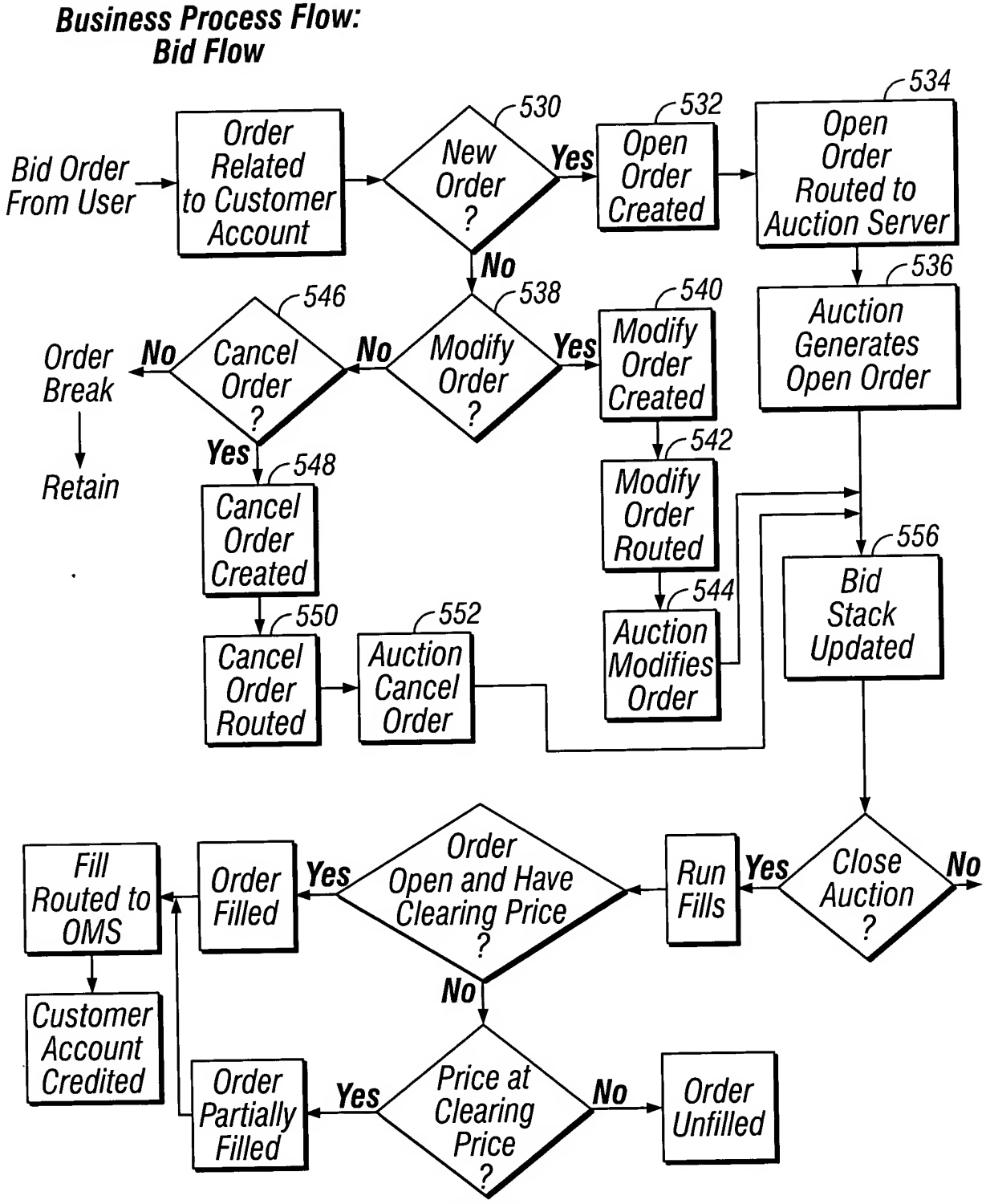

Business Process Flow:
Bid Flow
Bid Order From User
Order Related to Customer Account
530
New Order ?
Yes
532
Open Order Created
534
Open Order Routed to Auction Server
No
536
Auction Generates Open Order
538
Modify Order ?
Yes
540
Modify Order Created
542
Modify Order Routed
544
Auction Modifies Order
No
546
Cancel Order ?
No
Order Break
Retain
Yes
548
Cancel Order Created
550
Cancel Order Routed
552
Auction Cancel Order
556
Bid Stack Updated
Close Auction ?
Yes
No
Run Fills
Order Open and Have Clearing Price ?
Yes
Order Filled
Fill Routed to OMS
Customer Account Credited
No
Price at Clearing Price ?
Yes
Order Partially Filled
No
Order Unfilled

FIG. 11

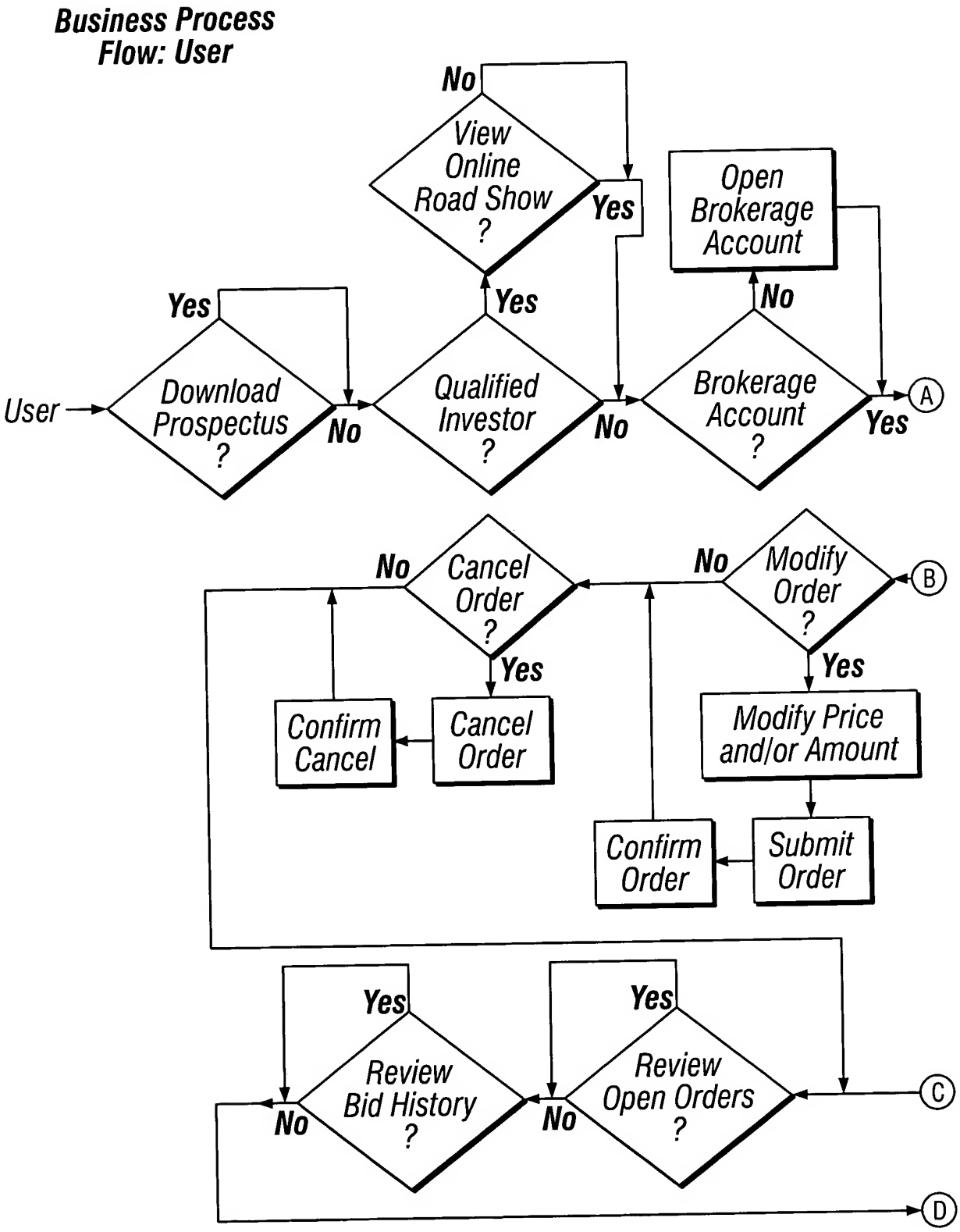

Business Process Flow: User
User
Download Prospectus ?
Yes
No
Qualified Investor ?
Yes
No
View Online Road Show ?
No
Yes
Brokerage Account ?
No
Yes
A
Open Brokerage Account
Cancel Order ?
No
Yes
Confirm Cancel
Cancel Order
Modify Order ?
No
Yes
B
Modify Price and/or Amount
Submit Order
Confirm Order
Review Bid History ?
Yes
No
Review Open Orders ?
Yes
No
C
D

FIG. 12A

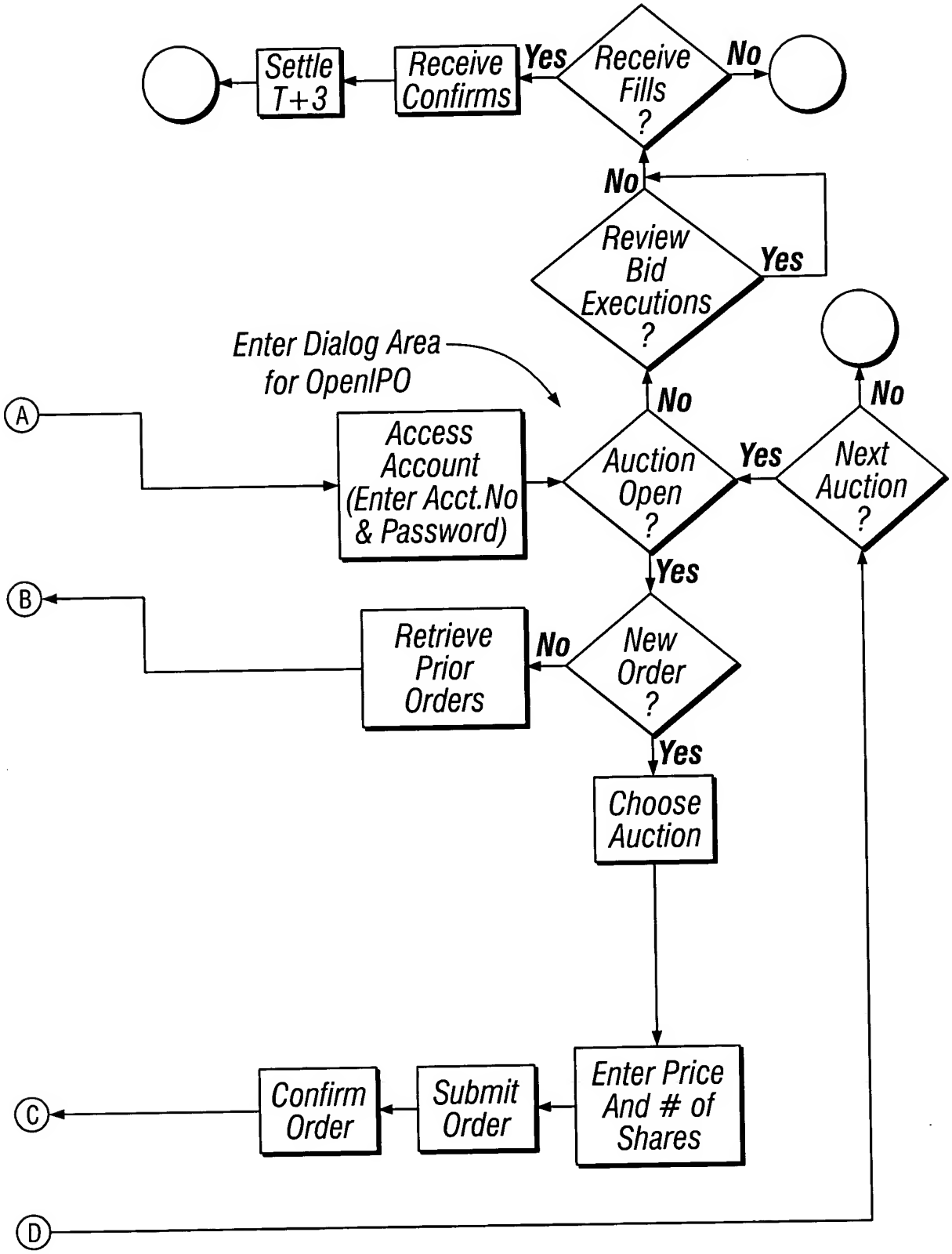

Settle T+3
Receive Confirms
Yes
Receive Fills ?
No
No
Review Bid Executions ?
Yes
Enter Dialog Area for OpenIPO
No
No
A
Access Account (Enter Acct.No & Password)
Auction Open ?
Yes
Next Auction ?
Yes
B
Retrieve Prior Orders
No
New Order ?
Yes
Choose Auction
Enter Price And # of Shares
Submit Order
Confirm Order
C
D

FIG. 12B

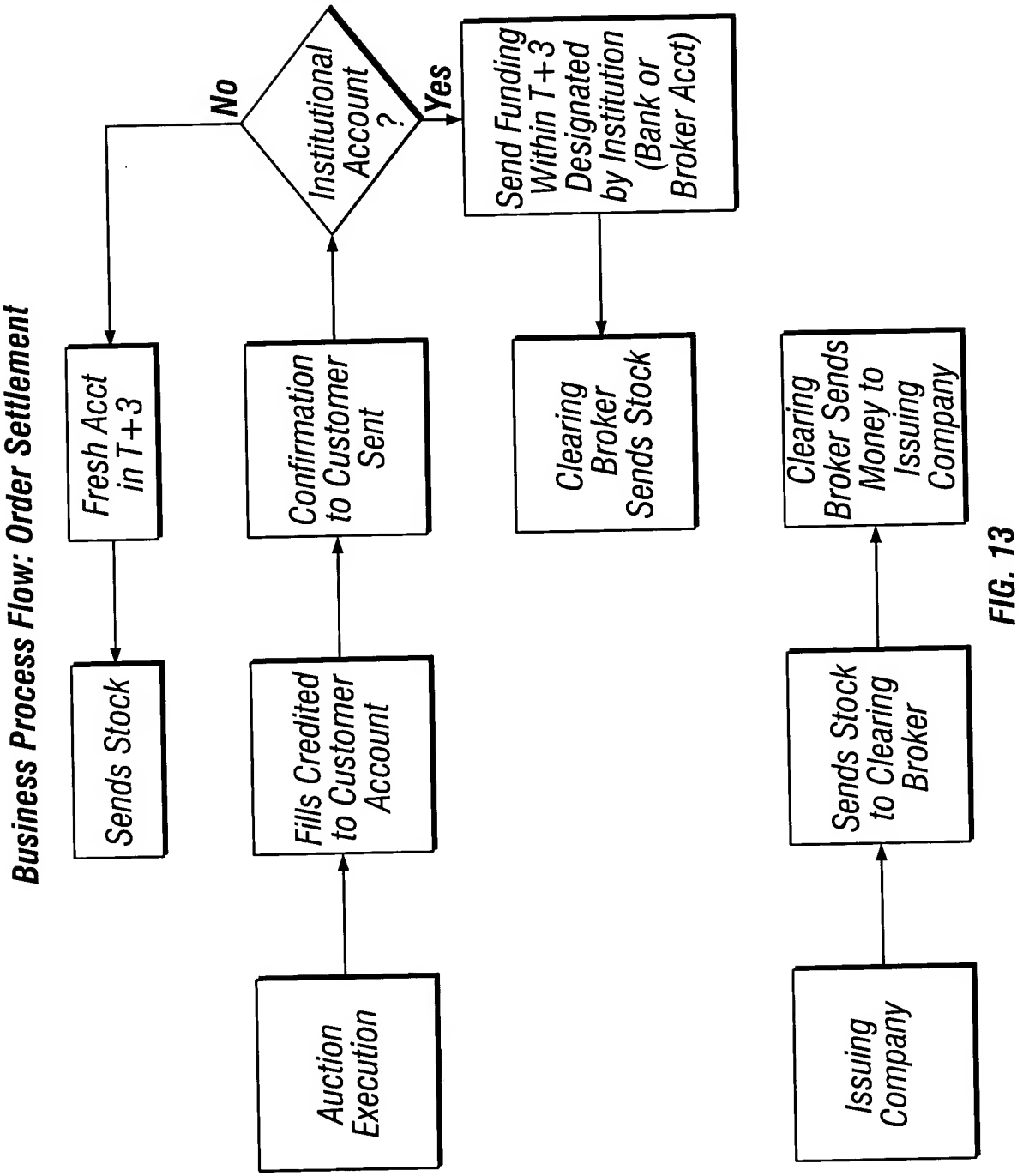

Business Process Flow: Order Settlement
Auction Execution
Fills Credited to Customer Account
Sends Stock
Fresh Acct in T+3
Confirmation to Customer Sent
Institutional Account ?
No
Yes
Send Funding Within T+3 Designated by Institution (Bank or Broker Acct)
Clearing Broker Sends Stock
Issuing Company
Sends Stock to Clearing Broker
Clearing Broker Sends Money to Issuing Company

FIG. 13

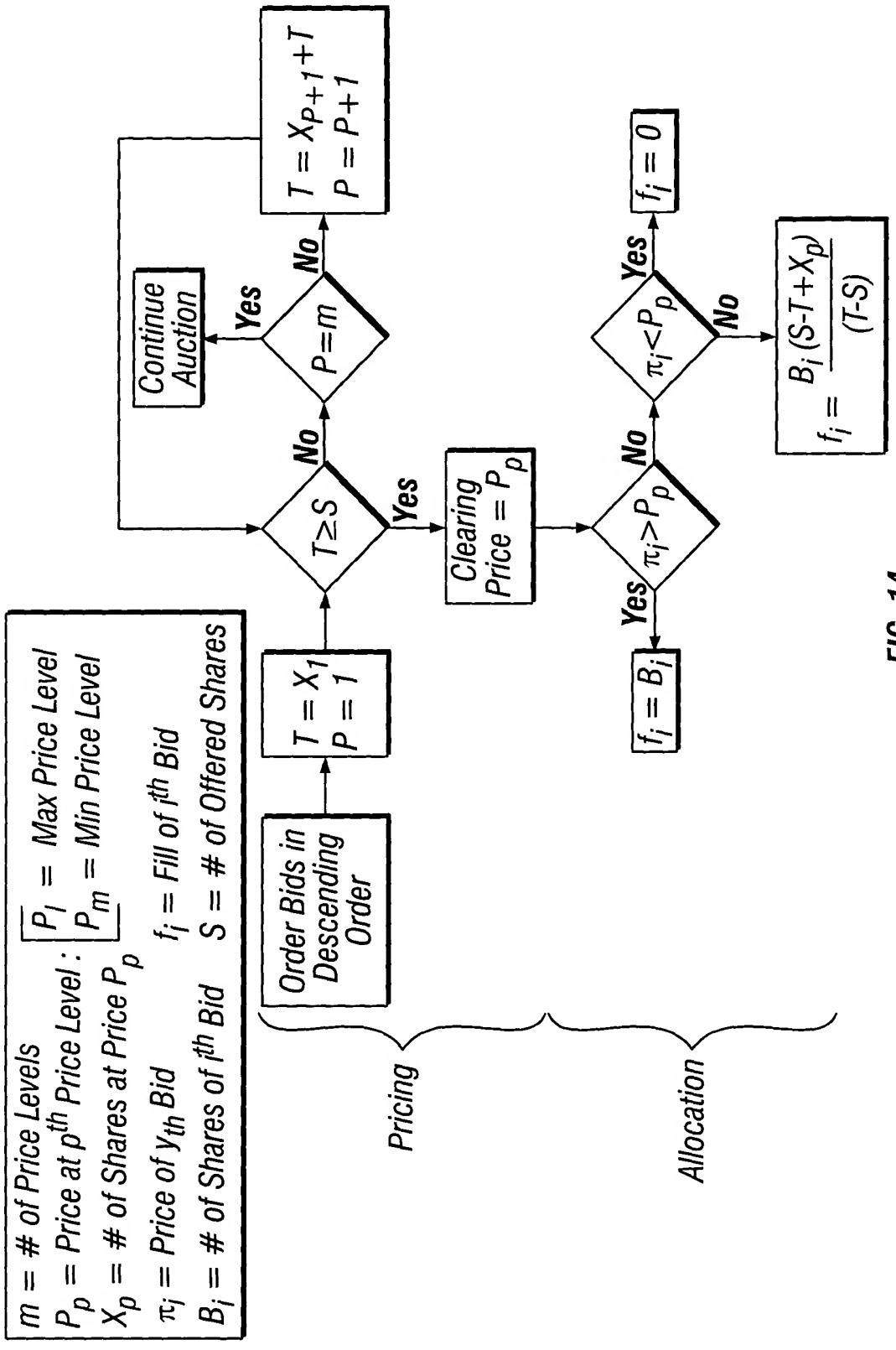

Business Process Flow: Dutch Auction Algorithm
m = # of Price Levels
P_p = Price at p^{th} Price Level : P_l = Max Price Level, P_m = Min Price Level
X_p = # of Shares at Price P_p
π_i = Price of y_{th} Bid
f_i = Fill of i^{th} Bid
B_i = # of Shares of i^{th} Bid
S = # of Offered Shares
Order Bids in Descending Order
$T = X_1$
$P = 1$
$T \geq S$
No
Yes
$P = m$
No
Yes
Continue Auction
$T = X_{P+1} + T$
$P = P + 1$
Clearing Price = P_p
$\pi_i > P_p$
No
Yes
$f_i = B_i$
$\pi_i < P_p$
No
Yes
$f_i = 0$
$f_i = \frac{B_i (S - T + X_p)}{(T - S)}$
Pricing
Allocation

FIG. 14